15¢

$5.00 A YEAR

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

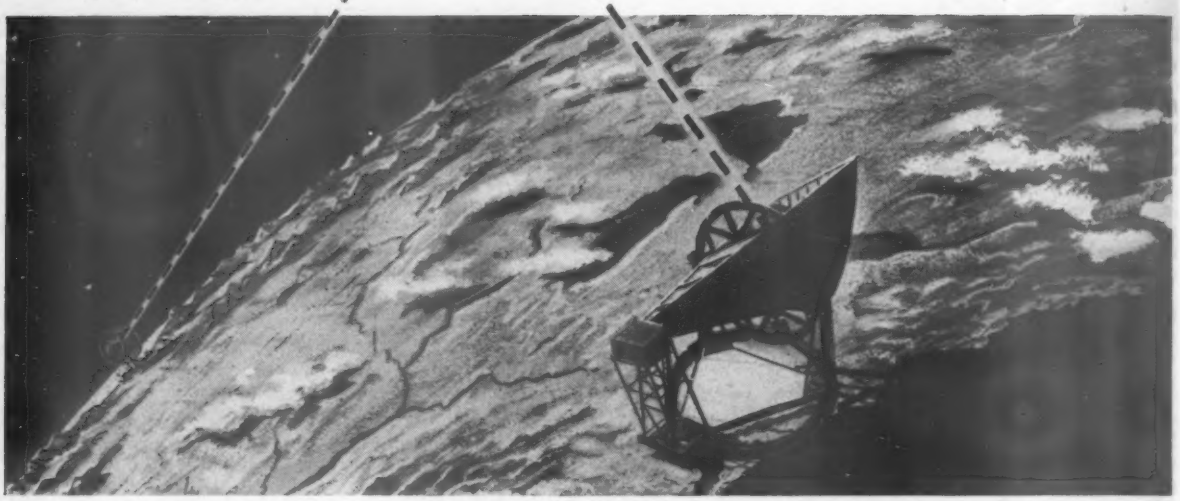
RECEIVED
NOV 8 - 1960
UNIVERSITY

MIAMI UNIV LIBRARY
PERIODICAL RECORD
OXFORD OHIO
DEC 60 879-344 88 P

A SCIENCE SERVICE PUBLICATION

FIRST PHONE CALL VIA MAN-MADE SATELLITE!

"Project Echo" satellite went into a near-perfect circular orbit 1000 miles high, circling the earth once every two hours. Its orbital path covered all parts of the U. S.



BELL TELEPHONE LABORATORIES BOUNCES VOICE OFF SPHERE PLACED IN ORBIT A THOUSAND MILES ABOVE THE EARTH

Think of watching a royal wedding in Europe by live TV, or telephoning to Singapore or Calcutta—*by way of outer-space satellites!* A mere dream a few years ago, this idea is now a giant step closer to reality.

Bell Telephone Laboratories recently took the step by successfully bouncing a phone call between its Holmdel, N. J., test site and the Jet Propulsion Laboratory of the National Aeronautics and Space Administration (NASA) in Goldstone, California. The reflector was a 100-foot sphere of aluminized plastic orbiting the earth 1000 miles up.

Dramatic application of telephone science

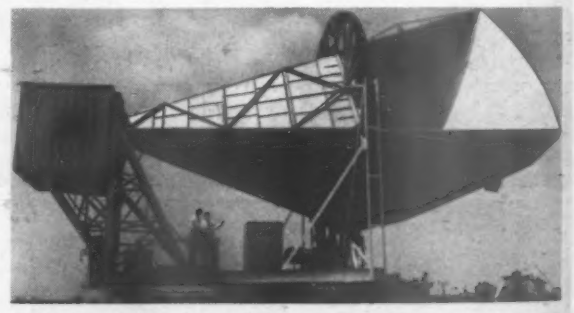
Sponsored by NASA, this dramatic experiment—known as "Project Echo"—relied heavily on telephone science for its fulfillment . . .

▪ The Delta rocket which carried the satellite into space was steered into a precise orbit by the Bell Laboratories Command Guidance System. This is the same system which recently guided the remarkable Tiros I weather satellite into its near-perfect circular orbit.

▪ To pick up the signals, a special horn-reflector antenna was used. Previously perfected by Bell Laboratories for microwave radio relay, it is virtually immune to common radio "noise" interference. The amplifier—also a Laboratories development—was a traveling wave "maser" with very low noise susceptibility. The signals were still further protected from noise by a special FM receiving technique invented at Bell Laboratories.

"Project Echo" foreshadows the day when numerous man-made satellites might be in orbit all around the earth, acting as 24-hour-a-day relay stations for TV programs and phone calls between all nations.

This experiment shows how Bell Laboratories, as part of the Bell System, is working to advance space communication. Just as we pioneered in world-wide telephone service by radio and cable, so we are pioneering now in using outer space to improve communications on earth. It's part of our job, and we are a long way toward the goal.



Giant ultra-sensitive horn-reflector antenna which received signals bounced off the satellite. It is located at Bell Telephone Laboratories, Holmdel, New Jersey.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

GENETICS

History-Making "Churk"

U. S. Department of Agriculture scientists have crossed chicken and turkey to produce a "churk," the first known hybrid of two families of birds.

See Front Cover

➤ A CHICKEN and a turkey have been crossed to make the "churk," a bird as rare as hen's teeth.

This hybrid, the first of its kind, is not for the Thanksgiving table—only three are now alive. The father is a dark Cornish chicken, the mother, a white Beltsville turkey.

The history-making cross of two families of birds was achieved by Dr. Marlow W. Olsen of the poultry research branch of the U. S. Department of Agriculture in Beltsville, Md.

A bare-necked chicken, or Transylvania fowl, has sometimes been called a turken and claimed to be a cross between a chicken and a turkey. It is not, said Dr. Olsen; it is a true chicken.

Dr. Olsen said the chicken-turkey cross, seen on the cover of this week's SCIENCE NEWS LETTER, has the long neck and the white skin of its turkey mother, and the general size and dark coloring of the feathers of its chicken father. Its long neck is feathered but without wattles. Its legs are like those of a young turkey.

Dr. Olsen said it would not be practical to produce the hybrids commercially since they are very difficult to bring through the hatching stage and keep alive. Some 2,900 eggs were processed to produce the live birds.

All the "churks" have some defects, such as crooked legs or beaks. Another abnormality, Dr. Olsen said, is that the hybrid birds' feathers grow in a twist, probably because of unequal growth in the cells.

The hybrids, which are now between seven and eight months old, are weak individuals, Dr. Olsen said. They have only about half the intelligence of the parent stock. They are kept in a separate pen by themselves because they would be pecked to death if mixed with other fowl, either chicken or turkey.

The "churk" is a silent bird. It has neither the "gobble, gobble" of the turkey parent nor the crowing of the rooster father. Dr. Olsen said it lets out a chirp something like a chicken, but only when it is disturbed.

The hybrids are all male birds and unable to reproduce. The reason for this is the different number of chromosomes in chickens (six pairs) and turkeys (nine pairs). The hybrids get a single set of chromosomes from each parent (six from the chicken, nine from the turkey). Thus, they end up with 15 chromosomes that cannot pair up and produce offspring. This means that a turkey and a chicken would have to be cross-bred every time a hybrid is to be produced.

The "churk" was produced completely by accident, Dr. Olsen said. Geneticists have tried unsuccessfully to produce this cross-breed at Beltsville and elsewhere. Drs. V. S. Asmundson and F. W. Lorenz reported experiments in Poultry Science, 36:1323, 1957, with hybrids of ring-necked pheasants, turkeys and domestic fowl, none of which ever hatched.

Dr. Olsen's chicken-turkeys showed up in a batch of turkey eggs he had fertilized artificially from dark Cornish chicken stock in trying to produce parthenogenetic, or fatherless, turkeys.

The fatherless turkey was originally bred by Dr. Olsen at Beltsville. These turkeys, the offspring of virgin turkeys, are always male.

In the experiment that led to the "churk," Dr. Olsen was hoping to encourage parthenogenesis in the turkeys by inseminating them with the dark Cornish chicken stock. The hybrids resulted, however.

Dr. Olsen said that cross-breeding would not be successful if ordinary turkeys and dark Cornish fowl were used to produce the hybrid. He selected stock that showed particular tendency toward parthenogenesis for his experiment.

• Science News Letter, 78:291 November 5, 1960

MEDICINE

Bacterial Mutant Helps Faulty Transport Study

➤ A BACTERIAL MUTANT that lives very well with an impaired ability to transport potassium across cell membranes is helping scientists find out how substances are transported through cell boundaries.

At present, transport is believed due to the operation of energy-dependent pumps in the cell membrane, but the exact chemical nature of the pumps and their link to metabolic energy sources are not known.

Produced by irradiation of normal *Escherichia coli* and isolated by Drs. Stanley G. Schultz and Arthur K. Solomon of Harvard Medical School, the mutant will lend itself to studies of faulty transport, believed to be an important factor in congestive heart failure, hypertension and kidney disease.

• Science News Letter, 78:291 November 5, 1960

MEDICAL TECHNOLOGY

Measure Blood Pressure With New Instruments

➤ TWO BLOOD PRESSURE instruments, one for man, the other for laboratory animals, were demonstrated at the 13th annual conference on Electrical Techniques in Medicine and Biology in Washington, D. C.

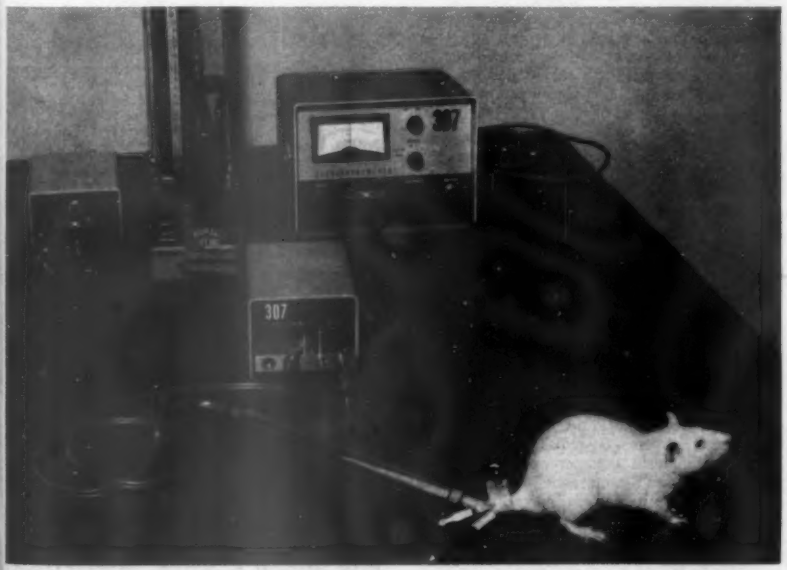
The Thorner Pulsensor, for the ophthalmic artery, the only branch of the brain circulation to leave the inside of the skull, measures the blood pressure of the human brain. It was conceived by Dr. Melvin Thorner, University of Pennsylvania.

The Pulsenor is fitted into both eye pieces of a pair of goggles which form an air-tight compartment around each eye socket.

The instrument to determine the blood pressure of animals is the Caudal Plethysmograph, which uses a glass tube molded tightly to enclose the animal's tail. Air is introduced into a cuff around the tail, and the air pressure is recorded by an electrical manometer.

Both instruments were developed by The Decker Corporation, Bala-Cynwyd, Pa.

• Science News Letter, 78:291 November 5, 1960



BLOOD PRESSURE TAKEN ON A RAT'S TAIL—using air pressure.

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

Recercas de Cancere.—Un nove technica se ha provate promittente in le inactivation del glandula pituitari effectuate como parte del therapia de cancere mammari. Tal cancere require pro su crescentia certe hormones que es fornite per varie glandulas del organismo in responsa a stimulos veniente ab le pituitario. Pro interrumper iste cyclo, on effectua frequentemente in casos de rapidemente crescente cancere mammari un excision del pituitario, e il es iste satis complexe e riscose operation que es reimplaciate in le nove technica (disveloppate al Universitate California a Los Angeles) per le implantation intrapituitari de micre granos de metallo radioactive. Iste implantation se effectua satis simplemente per medio de un agulia cave que es inserite in le pituitario via le naso e le sino. Le effecto del radioactive granos de metallo es le destruction del glandula pituitari.

Recercas de Febre Rheumatic.—Le reporto de un studio cooperative britanno-canadiano-statounitese del historia quinquenne de 497 juveniles con febre rheumatic revela que aspirina como agente therapeutic contra iste morbo non es minus efficace que le agentes hormonal ACTH e cortisona. Le studio etiam demonstra que le prognose pro patientes con febre rheumatic es relativemente favorable si al comenciamento del tractamento le corde es libere de inflammation. In le gruppo studiate, le mortalitate quinquenne esseva solmente tres pro cento. Le reporto conclude que iste excellente resultato es solo secundarimente le effecto de moderne methodos de tractamento de febre rheumatic per se sed primarimente le producto de factores indirecte como le disponibilitate de penicillina e sulfadiazina, le melioration del standards de vita in le population in general, e etiam le alteration que ha occurrite in le historia natural del morbo mesme.

Piscicultura.—Expertos de gustation in Wisconsin ha constatate experimentalmente que le gusto e le aroma de pisces es afficite recognoscibilemente (e adversemente) per le presentia de effluxos industrial in le aquas ab que illos es prendite. Variationes natural—profundor del aqua, turbiditate de illo, etc.—non pare haber ulle tal effecto. Etiam le sexo, le peso, o le longor del pisces non influentiava—in ille experimentos—le gusto e le aroma del pisces a grados detegibile per le expertos gustatori.

Telecommunicationes.—Cinquanta satellites del typo "Courier" sufficerea pro le establimento de un servicio omniglobal de telephono e de television. Le costo total esserea "solmente" cento septanta milliones dollars: cento pro le satellites mesme e septanta pro le stationes terrestre. Per omitter le television, on sparniarea cinquanta-cinque milliones. Iste cifras pare "astronomic", sed in proratation al singule canal de communication le costo de un tal systema esserea minus que in le caso del cablos transoceanic conventional. (E le existente cablos non es capace a portar signales de television.)

Statistica Medical.—Le practica que gruppos de medicos private organisa establimentos a base cooperative (con secretarias, archivos, equipamento, etc. in commun) es multo popular in le Statos Unite. Intra iste systema, un forte tendentia se nota de render le cooperation ancora plus intime, i.e. de constituer le gruppos individual ex representantes del major specialitates medical de maniera que le patiente pote satisfacer omne su requirimentos — non importa quanto diverse e specialisate—in un e le mesme loco. Assi non solmente le secretarias sed etiam le patientes, non solmente le equipamento sed etiam le revenitos es partitionate inter le medicos. Le numero total de iste typo de establimento in gruppo se ha triplicate depost 1949. Le statisticas pro 1959 indica le existentia de 1.154 gruppos multi-specialista medical in le Statos Unite, con le participation — a plen tempore o a tempore partial—de circa 15.000 medicos individual. Il es interessante notar que quasi 65 pro cento del total de tal establimentos medical in gruppo es incontrate in le statos del centro del pais. Le resto se distribue in duo portiones quasi equal inter le statos al costa del Pacifico e illos al costa del Atlantico.

Demographia.—Le scholas del Statos Unite alberga currentemente 45 milliones scholares e studentes. In 1980, iste numero va haber crescite a 59 milliones. Iste disveloppamento va sublevar formidabile problemas pro le quales nulle solution es preste. In contemplar los on comencia comprender que le "explosion del population mundial" (del qual multo es dicite e scribite) es profundemente problematic non solmente ab le puncto de vista del provision de alimentos.

Telephonia. — "Telephonos de securitate" (patente sollicitate) es jam disponibile al policia e al autoritates militar e va tosto esser lanceate al mercato general. Le invention es un accessorio portabile que functiona con transistores, require nulle energia externe, e es combinabile con non importa qual telephono private o public. Illo servi a disorganisar electro-acusticamente le elementos del parola ante lor transmission e subsequentemente a re-organisar los pro le comprension del audiente. Le systema complete consiste de duo apparatos in correlation specific e exclusive.

Computatores Electronic.—Le laboratorio de radiation del Universitate California ha installate—specificamente pro labores connectite con recercas fundamental de physica nucleari—un computator digital denominate UNIVAC LARC que contine 80.000 transistores, es capace a facer 250.000 additiones o 125.000 multiplicationes per secunda, possede un memoria magnetic con un capacitate de 97.500 parolas o cifras (de usque a 11 positiones), e ha accesso a tambures mnemonic con un capacitate additional de sex milliones parolas. Le computator pote reager a 76 differente instructiones. Su mechanismo imprimitori produce 720 lineas per minuta. Per medio de un accessorio photographic, iste rendimento pote esser augmentate a 9.600 lineas per minuta.

Astronautica.—Signalava Dr. C. S. Pittindrigh del Universitate Princeton in un interview que le vita human es rhythmic, cyclic, periodicitari. Sub conditiones normal, le contento de sucro in nostre sanguine, le activitate de nostre glandulas endocrin, e multe altere parametros e agentes de nostre organismo cresce e declina con le alternation de die e nocte. Dr. Pittindrigh opina que un simulation artificial de die e nocte va esser indispensabile pro le occupantes de astronaves futur pro evitar varie generes de serie dysfunction physiologic e etiam psychologic.

Computatores Electronic.—Le si-appellate "cerebros electronic" manipula le information presentate a illos in le forma de lo que on designa como "lingua de computator". Infelicemente, diverse systemas utilisa diverse linguas de maniera que per exemplo un computator IBM non "comprende" un computator Sperry-Rand, i.e. que le rendimento del un non es re-utilisabile in le altere. Effortios de standardisation e le production de transversores ha essite initiate per 24 del firmas active in le campo.

• Science News Letter, 78:292 November 5, 1960

GENERAL SCIENCE

Reading Interlingua

YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Alexander Gode, SCIENCE SERVICE'S Interlingua Division, 80 E. 11th St., New York 3, N. Y.

Financial contributions to the Interlingua program are needed.

• Science News Letter, 78:292 November 5, 1960

SCIENCE NEWS LETTER
VOL. 78 NOVEMBER 5, 1960 NO. 19

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright © 1960 by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also publishes CHEMISTRY (eight times a year) and THINGS of Science (monthly).

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulations.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: William W. Rubey, U. S. Geological Survey; Wallace R. Brode; Douglas Whitaker, Rockefeller Institute for Medical Research. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; Philip Bard, Johns Hopkins University; Henry Allen Moe, John Simon Guggenheim Memorial Foundation. Nominated by the National Research Council: Leonard Carmichael, Smithsonian Institution; John R. Dunning, Columbia University; Benjamin H. Willier, Johns Hopkins University. Nominated by the Journalistic Profession: Michael J. Ogden, Providence Journal-Bulletin; O. W. Riegel, Washington and Lee University; Lee Hills, Detroit Free Press. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Frank Ford, Washington, D. C.; Charles E. Scripps, Cincinnati, Ohio.

Officers—President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: Wallace R. Brode; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Gloria Ball, Ann Ewing, W. T. M. Grigg, Lillian Levy, Faye Marley, Jane Marye, Tove Neville, Marjorie Van de Water, Judy Viorst. Science Youth Division: Joseph H. Kraus, Shirley Moore, Dorothy Schriver, Leslie Watkins. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Syndicate Sales: Hallie Jenkins. Librarian: Margit Friedrich. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, MEtropolitan 8-2562.

GEOPHYSICS

Detect Infrasonic Waves

► A NEW WAY of detecting and recording tornadoes and earthquakes by their sound waves has been developed at the National Bureau of Standards.

These sound waves have about the same intensity as speech. However, they are too low in frequency to be heard and are called infrasonic waves, the Acoustical Society of America meeting was told in Washington, D. C.

There are many sources of infrasonic waves, but only a few have been identified so far. To record the waves, four microphones were set up near Washington, producing frequency-modulated voltages from the sound pressures received. These voltages were then transmitted by telephone wires to a central location where they were demodulated, amplified and recorded as ink traces on paper.

When a sound wave of enough magnitude is present, similar traces are produced on each of the four paper records from the four microphones. The direction from which the wave is coming as well as its speed are obtained by comparing the different times it hits the four microphones.

The infrasonic waves from the earthquake in Montana on Aug. 18, 1959, were measured with this microphone system when they hit Washington. Severe tornadoes produce infrasonic waves at Washington even when they are more than 1,000 miles away. Infrasonic waves are also generated during geomagnetic storms caused by disturbances in the earth's magnetic field.

The sound studies at the Bureau of Standards were begun by the late Dr. Peter Chrzanowski and are being continued by the sound section staff. Contributing to this research have been Drs. Richard K. Cook, J. M. Young, H. L. Marrett, Gary Greene and K. T. Lemmon.

The Bureau is planning to install a sound-recording unit similar to that in Washington near Boulder, Colo.

• Science News Letter, 78:293 November 5, 1960

CALIBRATION OF INFRASONIC MICROPHONE—by D. M. Caldwell.

GEOPHYSICS

Geomagnetic Field Hazard

► THE DIRECT INFLUENCE of the earth's magnetic field on space travel is negligible, but indirectly the geomagnetic field is responsible for the greatest hazard of manned space flight, the dangerous Van Allen belts of radiation, Dr. Walter Dieminger, professor of astronomy at the University of Goettingen, Hanover, Germany, told SCIENCE SERVICE.

The visiting German scientist reported on magnetic fields at the symposium on Medical and Biological Aspects of the Energies of Space arranged by the Southwest Research Institute at the School of Aviation Medicine, Brooks Air Force Base, San Antonio, Tex.

The trapping of the high energy particles by the geomagnetic field in the Van Allen belts causes a danger area to man in space because of radiation.

"The screening effect of the magnetic field affords a natural protection from this radiation," Dr. Dieminger said.

Weight considerations would make it impossible to effectively screen a space ship and its human occupant from prolonged exposure to the Van Allen belts. The high energy radiation there far exceeds any that can be duplicated on earth.

The 12-foot concrete walls used to screen the radiation produced by some nuclear reactors could hardly be used in a space vehicle, Dr. Dieminger said.

He suggested that one solution lies in swift transit through these danger areas so that man would be exposed to the radiation for a minimum of time. However, he would receive some exposure even if the transit time was a matter of hours.

Theoretically, if man could make his leap into space from the polar areas of the earth, he could avoid the dangerous Van Allen belt exposures.

This is because above these regions "nature has provided a way of escape by 'funnels' of low radiation intensity above the geomagnetic poles," Dr. Dieminger said. However, physical problems of launchings in these remote areas are at present too great to overcome.

If man can be protected while he goes through the relatively shallow but dangerous Van Allen regions of outer space, he probably can safely navigate in the depth of the cosmic ocean of outer space. There is, however, the possibility, pointed out by Dr. Dieminger, that even these relatively safe areas may contain waves or clouds of magnetically trapped solar gas. If a space ship should plunge through these, the effect on the occupant would be lethal.

So far, however, there is no direct knowledge that such danger spots exist. Space vehicles, as probes, are an excellent means of investigating directly the magnetic fields in space and provide an estimate of the more harmful indirect effects, insofar as man in space is concerned, Dr. Dieminger said.

"The magnetic field of the earth has been used for navigation for more than 4,000 years, and up to now nobody knows its origin. Carefully designed experiments not too far in the future will provide this important scientific information," he predicted. This in turn could bring knowledge that would enable better planning for long-range space flights.

• Science News Letter, 78:293 November 5, 1960

Used and Approved by Leading Universities!

Now you can enjoy the same superior performance at the low DYNASCOPE price!

4-Inch Dynascope

Only **$59.95**

F.O.B. Hartford
Shipping Wt. 16 lbs.
Express charges collect
Same model with new Dyn-O-Matic Electric Drive only $79.95 F.O.B. Hartford

Comes complete with sturdy steel tripod that sets up instantly on uneven terrain. Folds up for carrying.

America's most popular 4-inch reflector! Includes such professional features: 4-inch parabolic pyrex mirror, aluminized and quartz coated • Quick-action equatorial and altazimuth mount with fingertip control • Setting circle • 4-power crosshair finderscope • Rack & Pinion focusing • 3 compound eyepieces (65X, 130X, 167X). • Lifetime 45° bakelite tube.

Model RV-6

6-Inch Dynascope

ONLY **$194.95**

F.O.B. Hartford
Shipping Wt. 50 lbs. Express charges collect

New Dyn-O-Matic Electric Drive assures effortless, automatic tracking. Use any A.C. household socket.

Finest American-made 6-inch reflector in its price range! Save $100 or more, yet get all these fine features: f/8 6-inch mirror accurate to ⅛ wave • electric drive • 3 matched eyepieces (75X, 150X, 343X) • 6x30 Achromatic finderscope • Heavy-duty mount with setting circles • Rack & Pinion eyepiece holder • Rotating tube • Sturdy lightweight tripod.

FREE FACTS
on new 6", 8", 10", 12", 16" Custom DYNASCOPES
Mail coupon today!

Criterion Manufacturing Company
Dept. HL-72, 331 Church St., Hartford 1, Conn.

☐ Under your money-back guarantee, please ship me promptly the DYNASCOPE checked below. My payment in full enclosed.
☐ 4-inch $59.95 ☐ 6-inch $194.95
☐ 4-inch with Electric Drive $79.95
☐ Send FREE LITERATURE on Custom DYNASCOPES and details of your Easy Payment Plan.

Name _____
Address _____
City _____ State _____

PUBLIC SAFETY

Safety Claim Challenged

➤ THE ATOMIC ENERGY Commission's claim of perfect safety record in "regularly operating reactors" has been challenged. The AEC safety claim was made in a Government petition to the Supreme Court to approve its procedures for the licensing of developmental nuclear reactors.

The AEC petition was filed in an effort to get the Supreme Court to overrule a finding by the U. S. Court of Appeals that AEC procedures in licensing the construction of a nuclear power plant at Lagoona Beach, Mich., about 30 miles southwest of Detroit, did not give sufficient consideration to the question of safety in the operation of such a reactor so close to a large population center.

The successful challenge to the AEC licensing at Lagoona had been initiated in the Appeals Court by the International Industrial Division of the AFL-CIO (IUD-AFL-CIO). The AFL-CIO had until the end of October to file an answer to the AEC petition to the Supreme Court.

The Atomic Energy Technical Committee (AETC) of the IUD-AFL-CIO has released a study entitled "A Few Atomic Reactor Accidents."

The list, prepared by Leo Goodman, secretary of the AETC, was prompted by an AEC report issued to the Congressional Joint Committee on Atomic Energy on March 22, 1957, entitled the Brookhaven (Wash. 740) report. This document contained the claim that the chances of an accident in an atomic reactor having major effects on the public ranged from a chance of one in 100,000 to one in a billion per year for each large reactor.

Seven accidents had occurred in "regularly operating reactors" here in the United States up to the time the Brookhaven report was issued. The up-dated AETC list reveals 32 reactor accidents both here, in Canada, and in Europe from 1947 to July of 1960.

On the basis of these findings, Mr. Goodman has charged that "both the authors of the Brookhaven report and the Atomic Energy Commission failed to tell the Joint Committee the full story regarding the hazards of atomic reactors when they filed the Brookhaven report."

He told SCIENCE SERVICE, "Since the report has been filed, the number of atomic accidents which have occurred requires, in my judgment, a Congressional review of the procedures for choosing sites for atomic reactors."

These accidents are recorded in technical literature, including reports of the Joint Atomic Energy Committee and AEC reports.

• Science News Letter, 78:294 November 5, 1960

ASTRONAUTICS

"Bumpers" for Space Ships

➤ SOUND-PROOFED "meteor bumpers" for space ships are needed to provide important psychological and physical protection for astronauts traveling through fast moving concentrations of space dust as they leave the earth, Dr. Fred L. Whipple, director, Smithsonian Astrophysical Observatory and a professor of astronomy at Harvard University, reported.

The sound of the tiny "cosmic puff balls" as they hit the space vehicles may give the occupying astronaut "the sense of being under military siege," he warned scientists attending the symposium on the Medical and Biological Aspects of the Energies of Space, held by Southwest Research Institute at the Air Force School of Aviation Medicine in San Antonio, Tex.

The concentration of space dust close to the earth is 100 to 10,000 times as high as that encountered some 80,000 miles in space, Dr. Whipple said. His estimates are based on information received from rocket and satellite "near-earth" probes for meteoritic dust content.

Although the high concentration "does not greatly endanger space vehicles," the astrophysicist believes that the psychological effect of their bombardment would be a hazard.

He pointed out that "some small holes certainly will be shot through the skins of the space vehicles by the small particles in space."

Protection both for the ships and their occupants from the "barrage of natural projectiles" could be given if the "meteor bumper" suggested by him many years ago, consisting of a thin outer shell beyond the major walls of space vehicles, were "acoustically insulated."

The effect of the space dust concentration is completely absent at one-third the moon's distance, Dr. Whipple said. The concentration so great close to earth cannot be explained adequately.

The scientist suggested that possibly the small particles are highly charged to hundreds of volts as they enter the Van Allen belts of dangerous radiation near the earth.

This charge may burst the small particles that are suspected of being very weak structures: what he described as "a popping of tiny cosmic puff balls."

"The earth's gravitational attraction can produce some concentration of dust if one postulates that the dust is moving in nearly circular orbits close to the plane of the earth's motion," he said.

In spite of the increased concentration of dust near the earth, Dr. Whipple finds that at moderate distances optical surfaces will not be etched appreciably by interplanetary material for many years.

Consequently, astronomical telescopes or observatories may be maintained safely in space. Such observatories and telescopes are planned for orbit in the near future.

• Science News Letter, 78:294 November 5, 1960

GENETICS

Cell Inheritance Found

➤ A REVOLUTIONARY genetic discovery in which a type of cell inheritance is controlled by the structural organization of the cell itself, regardless of its gene content, was reported by Dr. Tracy M. Sonneborn, Indiana University geneticist, in a Vanuxam lecture at Princeton University.

Dr. Sonneborn said that in his laboratory, radically differing types of the one-celled animal paramecium, a type of protozoan, having identical genes, reproduced themselves true to type. Their progeny remained different in spite of gene similarity.

Previous research by Dr. Sonneborn and his associate, Dr. Ruth Dippell, demonstrated genetic control by factors in the cytoplasm, the jelly-like mass of the cell surrounding the gene-carrying nucleus.

The new hereditary basis, Dr. Sonneborn said, resides in the cortex, or outer layer of the cell.

By controlled treatment with antiserum during mating of the one-celled animals, the researchers produced new kinds of paramecia. Two cells became fused, forming a double animal, after which the abnormal doublets were mated with normal single cells. The doublets then reproduce themselves, as do the singlets.

There was the usual exchange of genes in the mating of the doublets and singlets, despite the fact that the doublets henceforth produced doublets and the singlets, singlets. Despite carrying similar cytoplasm, the two types were shown to reproduce themselves.

Portions of the cortex of one animal were broken off and attached to another as further proof that the cortical structure reproduces itself. These portions became part of the host animal, with two each of several of the usual parts. Its progeny all had the extra parts, although their genes were the same as those of normal ancestors.

Dr. Sonneborn said he did not doubt that the genes direct the production of all the substances utilized in the construction of the hereditary organization of the cortex. He even conceded that the genes may determine in some obscure way the mechanisms by which the various parts of the new cortex are produced during cell division.

But regardless of gene connection with the mechanisms, the geneticist said "the mechanisms are such that changes in the organization of the cortex reproduce themselves."

• Science News Letter, 78:295 November 5, 1960

ASTRONAUTICS

High Radiation in Space

➤ UNLESS ASTRONAUTS will risk exposure to extremely high levels of radiation in far space, man may be barred from travel to the moon and other bodies of the sun's system.

Dr. Cornelius A. Tobias of the University of California said that the radiation associated with solar flares presents the most serious hazard known to manned travel in space.

The lethal doses of radiation released by giant solar flares must be taken into consideration in planning any long-term space flight, Dr. Tobias reported to the symposium on Medical and Biological Aspects of Energies of Space in San Antonio, Tex.

Besides the giant flares, Dr. Tobias and Dr. Roger Wallace of the Lawrence Radiation Laboratory, Berkeley, Calif., have found that the sun's monthly activity would expose man in space to highly dangerous radiation doses—from five to 100 times the present levels of permissible occupational exposures.

Trying to avoid flare radiation by advance warning is impractical, since there is not sufficient time for evasive action, Dr. Tobias said. Shielding requires too much waste weight.

The problem, Dr. Tobias said, is sufficiently critical to require intensive study of solar flare activity.

One suggested solution is to design a space vehicle in such a way that the biological shielding would be provided by a material that also has other functions, such as a fuel reserve intended for the final retardation upon nearing earth on the return trip.

Another method for combating radiation damage might be "continuous treatment for radiation sickness" or other measures, Dr. Tobias said.

Besides learning more about solar flares, Dr. Tobias suggested investigating the dose rates that man can tolerate relative to the possible benefits of lunar and space flight.

The problem can perhaps be solved by a combination of a short trip, some shielding, prophylactic measures with regard to radiation sickness, and traveling at a period of minimum solar activity, Dr. Tobias said.

• Science News Letter, 78:295 November 5, 1960

ASTRONOMY

Astronomical Events Give Clue to Mayan Calendar

➤ A NEW WAY of converting dates in the archaic Mayan calendar into the familiar, modern calendar has been worked out by a United States astronomer.

The happy coincidence of an eclipse of the sun very close to the date of the passage of the planet Venus across the face of the sun gave Dr. Charles H. Smiley of Brown University, Providence, R. I., the conversion method. Because of the coincidence he was able to match the known date of such a pair of celestial events in ancient times with the date as recorded in Mayan records.

Dr. Smiley reported in Nature, 188:215, 1960, that the correlation rests in part on the assumption that the generally accepted Spinden correlation is correct within 100 years. This assumption has been confirmed by radiocarbon results. Dr. Smiley set the date 477 A.D. as the beginning of the Mayan calendar.

• Science News Letter, 78:295 November 5, 1960

FLYING "BARBER" POLES

AERONAUTICS

Eye Level "Poles" Provide Flight Data

➤ A NEW FLIGHT indicator enables the pilot of an aircraft to "watch" his flight instruments without looking at them. It eliminates the potentially dangerous period that occurs during landing when the pilot has to transfer his attention back and forth from instruments to visual flight.

The indicator was developed to meet the requirements of the British European Airways for instrument flight control equipment on their three-jet short-haul airliner, the Airco D.H. 121.

The new system was described to the International Air Transport Association meeting at Lucerne, Switzerland, by A. M. A. Majendie and K. Fearnside, research engineers of Smiths Aircraft Instruments, England, who worked on its development.

They reported that although aircraft instruments usually have to be viewed before information can be extracted from them, the required information can be seen "out of the corner of the eye" with the new indicators. In the system, three small "barbers' poles" painted black and white are used to provide information on the airplane's attitude.

• Science News Letter, 78:295 November 5, 1960

MEDICINE

Group Practice Units Have Tripled Since 1946

➤ GROUP MEDICAL PRACTICE units in the United States have tripled since 1946, with 1,154 groups in 1959 reporting as "multi-specialty" units.

This means that three or more physicans provide services in more than one medical field or specialty, with their combined income distributed according to a prearranged plan.

In a preliminary report to the American Association of Medical Clinics meeting in New Orleans, Dr. S. David Pomrinse, chief of health professions in the U. S. Public Health Service, said that about 37% of the groups responding to questionnaires were multi-specialty types.

More than 10,000 physicians are serving full-time, and 1,365 part-time in the 1,154 multi-specialty groups reporting, and an additional 355 physicians serve full-time and 3,062 part-time in 219 multi-specialty groups having fewer than three full-time doctors.

The study shows that 63.5% of the multi-specialty groups are in the central states, 13% in the middle and south Atlantic states, 7.3% in the mountain states, and 14.6% in the Pacific states. New England has only 1.5% of the groups.

The percentage of all practicing physicians in group practice is lowest in the New England and north Atlantic areas, and greatest in the Midwest.

When the study was made in 1959, 6.21% of all practicing physicians in the U. S. were in full-time group practice and 0.85% more were part-time group practitioners. The multi-specialty groups reported they planned to add more than 1,000 additional full-time physician members in 1960.

Dr. Marcus B. Goldstein of the Public Health Service collaborated in the preparation of both the 1946 and the 1959 reports.

• Science News Letter, 78:296 November 5, 1960

PUBLIC HEALTH

To Smoke or Not Smoke Is Put on Health Basis

➤ PREACHING to high school smokers is out of date. Now they are being told to make up their own minds, but warned that they may get lung cancer.

The American Cancer Society's cigarette education campaign during the past eight months has included distribution of more than 10,000 copies of a color-sound filmstrip "To Smoke or Not to Smoke?"

The film has had a record response of any educational tool on cancer, Walter G. James, director of public education, reported at the Cancer Society meeting in New York.

The film stresses that each student must decide whether or not to smoke, but emphasizes along with an accompanying leaflet "Shall I Smoke?" that cigarette smoking is connected with cancer.

Also accompanying the film is a chart "More Cigarettes More Lung Cancer" that shows the risk goes up in proportion to the amount smoked. Two packs or more a day increases the danger 20 times, the chart illustrates.

The majority of high school students are not regular smokers, and they are advised that if they have already started to smoke, their best prevention of lung cancer is to stop.

Mr. James said cooperation has been received from Departments of Education, local school boards, school authorities, the PTA and other community groups. In addition, the American Public Health Association continues to urge health officers and medical societies to collaborate. The National Tuberculosis Society also cooperates in many states, including Hawaii.

A preliminary study in Portland, Ore., showed that a very limited amount of education with teen-agers could be expected to bring a 20% reduction in new smokers.

• Science News Letter, 78:296 November 5, 1960

AEROMEDICINE

Oxygen Lack on Moon May Mean Birth Defects

➤ FEMALE EARTH COLONIZERS of the moon may have to return to earth to bear normal young because of insufficient oxygen.

The minimum for survival probably will not be enough oxygen to produce normal young on the moon, Drs. Bernard Baird and Sherburne F. Cook of the University of California, Berkeley, reported to the American Heart Association meeting in St. Louis.

Expectant mothers probably will need a steady supply of oxygen comparable to that on earth, they said.

The scientists based their conclusions on research with mice that showed a significant number of inborn heart defects among mice born to mothers exposed to an oxygen-poor atmosphere.

Although the mice were given enough oxygen for comfortable survival, the amounts still proved inadequate for normal reproduction. Pregnant mice exposed only six hours daily to oxygen-poor atmospheres at high altitudes, 20,000 feet, produced 99 young. Twelve had cardiovascular malformations. No defects were observed among 391 mice bred at sea level.

• Science News Letter, 78:296 November 5, 1960

MEDICINE

Early Surgical Treatment Helps Infants' Breathing

➤ EARLY SURGICAL treatment can save the lives of many newborn babies whose breathing is obstructed because of chest conditions. At the American Academy of Pediatrics meeting in Chicago, Dr. David R. Murphy of the Montreal Children's Hospital said diagnosis can usually be made without difficulty.

Chest conditions include cystic hygroma, in which a sac is distended with fluid; congenital laryngeal stenosis, in which the larynx is narrowed; and choanal atresia, in which there is absence of a normal opening.

• Science News Letter, 78:296 November 5, 1960

IN SCIEN

MEDICINE

Cancer Patients Respond To Treatment by Drug

➤ NINETEEN of 58 patients with inoperable cancer of the gastrointestinal tract showed decrease in the size of their tumors after treatment with 5-fluorouracil.

Dr. Arthur J. Weiss, coordinator of the cancer chemotherapy group of Jefferson Medical College, reported these statistics to the American College of Gastroenterology meeting in Philadelphia.

Improvement lasted from six weeks to three months in 15 of the patients and in four it lasted for a longer time. Dr. Weiss emphasized, however, that 5-fluorouracil is an extremely dangerous drug requiring close supervision by the physician.

Side effects include lowering of the blood count at first, diarrhea and inflammation of the mouth.

In spite of these effects, 21% of the patients treated said they felt better, even though no decrease in the size of their tumors could be seen.

Both colon and stomach cancer were treated with some response. Only one case of cancer of the liver showed improvement. Assisting Dr. Weiss in the treatment was Dr. Laird Jackson, a resident in medicine at the Jefferson Hospital, Philadelphia.

Five-fluorouracil was first synthesized by Dr. Charles Heidelberger at the University of Wisconsin in 1957 and tested there at the McArdle Memorial Laboratory on animals.

• Science News Letter, 78:296 November 5, 1960

MEDICINE

New High Blood Pressure Drug Needs Supervision

➤ CAREFUL SUPERVISION of patients taking a comparatively new oral hexamethonium drug for severe high blood pressure is advised by three scientists.

Drs. E. F. D. Montuschi, H. E. S. Pearson and L. L. Wilson of the Whittington Hospital in London report in the British Medical Journal, Oct 22, 1960, that fainting may occur when the drug, bretylium tosylate or "darenthin," is first introduced for hypertension treatment. Fainting may also occur unexpectedly later on.

Using darenthin in 75 cases of severe hypertension over a nine-month period, the investigators obtained successful control of blood pressure in 71%, including seven out of 13 cases of malignant hypertension.

Although the new drug is free of some of the disadvantages of previously used nerve-blocking drugs and is considered an important advance in hypertension treatment, its powerful and unpredictable action makes it potentially dangerous.

• Science News Letter, 78:296 November 5, 1960

NE FIELDS

AGRICULTURE

Asphalt Mulching Seen Promising for Arid Lands

➤ DRY WEATHER, the plague of the farmer and the home gardener, faces a formidable adversary in an asphalt mulching technique that can be applied directly to arid lands, or sprayed on narrow seed beds.

The cost per acre is estimated at approximately $30, completely coated, or only $5 to $10 for range reseeding, if the "band method" is used.

Developed by Esso Research & Engineering Co., the material is being field-tested on a variety of crops and grasses, in different climates and soils.

The resultant films are resistant to the erosive forces of nature for up to four months and are easily penetrated by a wide variety of grasses and vegetables. No toxic effects of the films on the various plants tested in the laboratory were noticed.

The asphalt mix is applied directly over seed beds, to trap the available moisture needed for germination and subsequent growth. Later rains "recharge" the zones, under the coated bands, to continue the process.

• Science News Letter, 78:297 November 5, 1960

BIOCHEMISTRY

Moth's Sex Attractant Synthesized by USDA

➤ AFTER 30 YEARS of searching, U. S. Department of Agriculture entomologists have isolated, identified and synthesized the chemical sex attractant that makes the female gypsy moth so alluring to the male. So potent is the substance that the fraction of a drop produced by the female is 200,000,000 times more than the amount needed to catch a mate.

The man-made chemical promises possible future elimination of the gypsy moth, a very damaging tree pest.

Drs. Martin Jacobson, Morton Beroza and William A. Jones of USDA's entomology research division, Beltsville, Md., isolated the powerful attractant by boiling down extracts from the last two abdominal segments of 500,000 virgin female gypsy moths. The end result was a colorless, blue-fluorescing liquid they identified as d-10-acetoxy-1-hydroxy-cis-7-hexadecene. One ten-millionth of a microgram of this substance, about a drop in a boxcar, is enough to attract the male.

The researchers, reporting in Science, 132:1011, 1960, then synthesized a slightly different form of the liquid compound and found it to be equally active. A second natural substance, a waxy solid, is about one-fourth as active.

The reason for the waxy substance is not known, but Dr. Jacobson says one possible theory is that the liquid chemical serves to attract the male from a long distance and the waxy substance "zeros him in" after he is in the immediate vicinity of the female.

The flightless female mates only once a year, and as soon as she does, an enzyme switches off production of the sex attractant.

The winged male, however, can mate several times and it is because of this the chemical could be used for pest control. By using a mixture of attractant and DDT in traps lined with a sticky substance called "tanglefoot," enough males could be caught to reduce substantially the gypsy moth population.

• Science News Letter, 78:297 November 5, 1960

MEDICINE

Gout Remedy Helps Other Arthritis Patients

➤ COLCHICINE, an alkaloid long used successfully in treating gout, has been effective in treating two cases of sarcoid arthritis in the U. S. Army Hospital in Munich, Germany.

Capt. Herbert Kaplan, assistant chief, medical service, U. S. Army Hospital, Munich, says that to his knowledge this represents the first report of the effectiveness of colchichine in an arthritis other than gout.

"The importance of finding a drug that may be of value in sarcoid arthritis cannot be underestimated," Capt. Kaplan reports in the New England Journal of Medicine, 263:778, 1960. "Joint involvement has been shown to occur in up to 25% of patients with sarcoidosis, and may cause chronic debility and joint destruction."

Steroids have been used and may be beneficial in the various types of sarcoidosis, a chronic ailment affecting the lymph glands, lungs, bones, intestines, spleen, liver and skin separately or in combination. However, Capt. Kaplan said colchicine, with its negligible toxic effects, seems to be an ideal method of treatment. The prolonged use of steroids is dangerous.

The favorable response of sarcoid arthritis to colchicine may be "considered additional support for the hypothesis that these diseases may be interrelated," Capt. Kaplan said.

• Science News Letter, 78:297 November 5, 1960

NUTRITION

Navajo Diet Protects From Coronary Disease

➤ THE LOW-CALORIE DIET of Navajo Indians may account for their lower incidence of coronary heart disease compared with the rest of the United States population, Dr. Reuben Straus of Burbank, Calif., told the American Heart Association meeting in St. Louis.

Although the fat percentage is high in the Navajo's diet, his well-functioning metabolism takes care of it, Dr. Straus said, reporting studies made with Dr. Robert J. Kositcheck and Moses Wurm, also of Burbank.

• Science News Letter, 78:297 November 5, 1960

BOTANY

Virus Infection May Be Assisted by Radiation

➤ THE INFECTIVE PROCESS of viruses may sometimes be aided by radiation.

This has been discovered by Drs. Jia-Hsi Wu and Irving Rappaport of the University of California, Los Angeles, botany department. These two UCLA scientists have demonstrated this effect in working with two strains of the tobacco mosaic virus.

They found that when they inoculated pinto bean leaves with the U-1 strain of the tobacco mosaic, characteristic virus infections of plant viral disease appeared in the leaves. Inoculation with the milder U-2 strain did not produce any manifestation of infection.

When the leaves are inoculated with a mixture of the two strains, the number of infections is markedly reduced. This suggests that there may be competition between the two strains, that the U-2 strain interferes wih the infectious process of the U-1 strain within the same leaf cell.

When the leaves inoculated with the mixture are irradiated with ultraviolet light, infections are increased. The scientists suggest that in leaf cells where the two strains of virus are competing, ultraviolet radiation may knock out the U-2 strain, allowing the U-1 strain to resume its damaging infectious process.

The probability of the radiation killing U-2 particles without damaging the U-1 particles is directly proportional to the number of new infections appearing after irradiation, they note.

• Science News Letter, 78:297 November 5, 1960

ASTRONOMY

Star Light, Star Bright, Can Be Measured Right

➤ ROCKET ASTRONOMY has provided man on earth with the first measurements in the far ultraviolet of the brightness of stars .

This is extremely important in advancing scientific knowledge of the evolution of stars, Dr. Herbert Friedman, superintendent of the atmosphere and astrophysics division of the U. S. Naval Research Laboratory, told SCIENCE SERVICE. Knowing more about how stars came to be will help bring man closer to the solution of how the universe came to be.

At the fourth Space Research and Technology Institute of the University of Maryland, Dr. Friedman stressed the importance of a better understanding of the earth's star, the sun, provided by rocket astronomy.

"Rocket astronomy provides the best picture of the interplanetary medium," he said. The interplanetary medium is the material between the earth and the other planets.

Rocket astronomy has helped provide information about the amount of hydrogen in the solar system. Hydrogen is the major constituent of the universe. The amount of hydrogen around the sun provides information about the sun's atmosphere.

• Science News Letter, 78:297 November 5, 1960

MEDICINE

Menace of Mental Retardation

Medical science gradually is pushing back the threat of mental subnormality. Findings from all over the world are adding up to a hopeful picture, Gloria Ball reports.

➤ EACH YEAR in the United States some 120,000 babies are born who are so mentally retarded that each is a family tragedy. That these children are a personal and social problem is reflected in the modest estimate that 5,000,000 persons, three percent of the United States population, are mentally subnormal.

Known causes of retardation may exert their influence before, during or after birth. The heartbreaking truth is that once the damage is done, no drug or operation will cure the malady.

Some primitive societies have avoided the problem by not allowing unfortunate victims of birth accidents to continue to live. But civilization takes care of its defectives. Because there is no cure, the real hope lies in prevention.

Far from being indifferent to the problem, the medical profession has stepped up its efforts tremendously in the last ten years. The U. S. Department of Health, Education and Welfare alone is spending more than $10,000,000 this year for research, rehabilitation, teacher training and parent counseling in mental retardation.

One of the biggest projects now in progress is the collaborative study sponsored by the National Institute of Neurological Diseases and Blindness, Bethesda, Md. During a five-year period 15 research centers will gather information on the pregnancies of 40,000 women and follow the children for at least six years.

With additional data on the social, economic, emotional, medical and genetic backgrounds of both parents, researchers hope to establish the significance of harmful factors and correlate them with resulting defects in the child.

Among conditions definitely associated with mental subnormality are those active in the prenatal period—metabolic disorders, Mongolism, radiation, fetal disease of the central nervous system, maternal diet deficiencies, and maternal infections with German measles, syphilis and toxoplasma; those related to delivery—prematurity, birth injury and asphyxia; and those that occur after birth—metal poisonings, head injuries, and lesions and infections such as encephalitis and meningitis.

Findings by two independent research groups suggest that viruses and cancer may be linked in some way with Mongolism, a mental-physical defect that occurs once every 600 to 700 births and becomes more probable as maternal age increases.

A U. S. team headed by Dr. Helene Toolan of the Sloan-Kettering Institute for Cancer Research, New York City, discovered that hamsters injected with cell-free filtrates of cancer cells developed Mongolism-like characters. An Australian group working on a 16-year health survey found that Mongoloid births came in "clusters" and suggested that a virus or combination of viruses was responsible. The action of such a viral infection, they believe, might be to damage the maternal chromosomes during sex-cell division. This suggestion becomes more significant when linked with the 1959 French find that Mongoloid children have an extra chromosome.

There is hope that mental damage due to German measles can be conquered by wiping out the disease itself. Although there is no proof of effectiveness to date, a measles vaccine developed by Dr. John F. Enders of Harvard University is now in the mass-testing stage in Nigeria.

So great is the present threat that when mothers have German measles in the first month of pregnancy, 96% of their babies are born with mental defects.

In the field of metabolic defects, advances have made it possible to prevent the brain damage that results from phenylketonuria.

One or two persons in every 50,000 are born with this metabolic disorder. They do not have a particular liver enzyme and, without it, the body cannot properly metabolize an amino acid, phenylalanine, found in protein. If unchecked, an intermediate metabolism product piles up in the brain and results in damage and retardation.

However, a telltale substance excreted in the urine can be detected by a simple test and if the infant phenylketonuric is put on a special diet before he begins eating protein, no extensive brain damage occurs. In Cincinnati, all newborns go home with a gauze pad inserted in the diaper. Later, the pad is returned to the laboratory where it is assayed for the presence of the substance that indicates phenylketonuria.

Among the unsolved mysteries associated with retardation is prematurity. In some cases prematurity is probably the result rather than the cause of the infant's defect, but prematurity itself does carry the risk of retardation.

Studies in England showed the chance of premature birth and other pregnancy complications is increased when the mother is very young. One expert believes age may not be the main factor, but that early marriage and early childbearing are characteristics of persons in lower socio-economic

NORMAL OR MENTALLY DEFICIENT?—Miss Mary Draffen, clinical psychologist at Gales Health Center, Washington, D. C., observes a child's facility for making pictures from mosaic pieces. A normal six-year-old can choose appropriate shapes and arrange them to resemble a familiar object.

groups who also have a poorer level of health and hygiene.

A second problem plaguing researchers is that there seems to be little correlation between detectable degrees of brain abnormality and the degree of retardation. Grossly deformed brains may carry little or no retardation, while those with no apparent malformation may belong to severely retarded persons. Pinpointing definite amounts of biochemical change holds much promise in this area.

Whatever the cause, and regardless of the advances in prevention, there are 5,000,000 persons in the U.S. who are already irreversibly retarded. About 150,000 of them are being cared for in institutions across the country.

Fortunately, most of the mentally deficient (85%) have I.Q.'s between 50 and 75 and can eventually advance to the mental age of eight to 12 years. They develop mentally and scholastically from one-half to three-fourths as fast as an average child. Although their vocabularies are always limited, they learn to read and do simple arithmetic, and by age 16 can handle second to fourth grade material. By learning to do unskilled or semi-skilled work, these "educable" children can usually support themselves.

The "trainable" group, with I.Q.'s between 20 and 49, comprise about half the population in institutions for the mentally subnormal. Limited to a mental age of three to seven years, these persons can learn to care for themselves, adjust to the society of family and neighborhood, and can help with simple tasks in a sheltered, supervised environment. Generally, academic pursuits are beyond their reach.

For the 3.5% of the mentally retarded who are totally dependent, life is a perpetual infant world that will never grow beyond the two-year-old level. So great are the needs of this group that three out of ten are placed under institutional care. For them, the need for a cure to be found is particularly urgent.

• Science News Letter, 78:298 November 5, 1960

PUBLIC SAFETY

Toxic Agents Curbed

➤ THE FOOD and Drug Administration is getting letters from different parts of the United States concerning dangerous ingredients of model airplane cement.

A typical case is that of a 13-year-old boy recently arrested in El Paso, Texas, who was "high" from sniffing a cloth soaked in model airplane "glue."

The FDA expects that the new Federal Hazardous Substances Labeling Act, passed by Congress this year, will be a help in protecting innocent youngsters from the dangers of inhaling solvents that could cause kidney, liver or blood damage. The Act provides that court action to enforce the law will begin in February, 1961.

Any effective solvent for plastics is likely to have a depressive effect on the central nervous system. Therefore, parents are warned to tell their children not to inhale fumes from cements used in making model planes.

One of the solvents used is Methyl Cellosolve (ethylene glycol monomethyl ether) which is rated as poisonous.

Gasoline or benzine were formerly used as solvents for these cements, but even these older solvents were hazardous. Not only can gasoline cause intoxication, as youngsters have discovered from uncapping and sniffing the gasoline tanks of parked cars, but there is an explosion and fire hazard.

When FDA starts to administer the new labeling law, the following information must be put on the labels of hazardous products:

1. Name and place of business of the manufacturer, packer or seller.

2. The common or usual name of each component that is toxic.

3. The signal word "Danger" must appear on substances extremely flammable, corrosive or highly toxic as defined in the Labeling Act.

4. The signal words "Warning" or "Caution" on all other hazardous substances.

5. An affirmative statement of the hazard, such as "flammable," "vapor harmful," "causes burns," "absorbed through the skin," or similar wording that describes the hazard.

6. Instruction when appropriate or necessary for first aid.

7. The word "Poison" if the substance is highly toxic.

8. Instruction for handling or storage of packages which require special care.

9. "Keep out of reach of children" or the practical equivalent of this statement.

10. All must be in English and prominent on the label, made conspicuous by typography, layout and color.

Hazardous substances which do not meet the labeling requirements are deemed misbranded under law and may not be shipped in interstate commerce.

• Science News Letter, 78:299 November 5, 1960

Do You Know

Blue tongue, a serious virus disease of *sheep,* is a warm weather disease carried from sheep to sheep by flying insects.

The Navajo is the largest of the remaining American *Indian* tribes.

Diseases of the *thyroid* gland are more common than those of any other endocrine gland.

In 1959, American dairymen were sixth in *milk* production per cow; cows in the Netherlands, Denmark, Belgium, West Germany and the United Kingdom produced more.

About two persons in every hundred over 40 years of age in the U.S. have *glaucoma.*

The best *fertilizers* for fall lawn care are those that contain a high percentage of nitrate nitrogen.

At last—
the perfect background book for supplementary reading—
CLASSICS IN SCIENCE

Edited by
E. N. da C. Andrade

This volume presents more than forty selected readings in scientific thought, method and applications, ranging from Aristotle, Ptolemy and Pythagoras to Darwin, Marconi and Appleton. Following a special introductory essay by Professor Andrade on the general topic: What Is Science?, the book presents a wide-ranging anthology of writings on the origin and meaning of science, the universe, matter and energy, and science and everyday life. Among the authors represented, in addition to the above, are Immanuel Kant, William Peddie, Copernicus, Galileo, Newton, Lavoisier, Osler, John Dalton, Michael Faraday, F. W. Aston, Hector Macpherson, Sir Charles Lyell, Richard Jefferies, C. F. Powell, Erwin Schrodinger and Sir Robert Ball.

"Thoroughly recommended as a guide to the basic principles of scientific method."—*Special Libraries Association*

"Valuable to anyone interested in the history of ideas. . . . It gives the reader a personal acquaintance with the people who have developed the ideas."—*American Journal of Physics*

$6.00

PHILOSOPHICAL LIBRARY, Publishers
15 East 40th Street, New York 16, N. Y.

Please send me_____copies of CLASSICS IN SCIENCE @ $6.00 per copy.

To expedite shipment I enclose

☐ Check ☐ Money Order

Name_____

Address_____

City_____ Zone____ State_____

Books of the Week

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

ALL THE SOUNDS WE HEAR—Lee Nelson—*Steck*, 40 p., illus. by A. Z. Ashley, $1.75. For young children, tries to make clear various sounds and the words used to describe them.

ALWAYS ANOTHER DAWN: The Story of a Rocket Test Pilot—A. Scott Crossfield with Clay Blair, Jr.—*World Pub. Co.*, 421 p., photographs, $4.95. Autobiography of the pilot of the experimental plane, the X-15.

BIRTH CONTROL TODAY: A Practical Approach to Intelligent Family Planning—Leon F. Whitney—*Nelson*, 143 p., illus., $2.95. Forthright and authoritative information on the subject.

BOX TURTLE LIVES IN ARMOR—Charles Paul May—*Holiday*, 47 p., illus. with drawings by Jane Castle, $2.50. Makes young children aware of the life and habits of turtles.

THE CARE OF PET TURTLES—Herndon G. Dowling and Stephen Spencook—*N. Y. Zoological Soc.*, 16 p., illus., paper, 25¢. Feeding, health problems, and general care of different species of turtles.

THE CHALLENGE OF THE SEA—Arthur C. Clarke, introduction by Wernher von Braun—*Holt, Rinehart and Winston*, 167 p., illus. with drawings by A. Schomburg, $3.95. The wonders of the ocean and what we may expect to know about it in the future.

CHARTING STEEL'S PROGRESS: A Graphic Facts Book on the Iron and Steel Industry—Introduction by Max D. Howell—*American Iron and Steel Institute*, 65 p., illus., paper, 50¢. Information based largely on the Institute's Annual Statistical Report.

CHEMISTRY AND TECHNOLOGY OF FERTILIZERS—Vincent Sauchelli, Ed.—*Reinhold*, 692 p., illus., $18. Discussion of the raw materials used in chemical fertilizers and their conversion to suitable compounds for use on crop plants.

THE CONCISE ENCYCLOPEDIA OF ARCHAEOLOGY—Leonard Cottrell, Ed.—*Hawthorn Bks.*, 512 p., illus., $12.95. For the general reader as well as the scholar, sums up the archaeological knowledge of our times.

CONTRIBUTIONS TO THE THEORY OF NONLINEAR OSCILLATIONS: Vol. V—Cesari J. LaSalle and S. Lefschetz, Eds.—*Princeton Univ. Press*, 286 p., paper, $5.

COUPLED MODE AND PARAMETRIC ELECTRONICS—William H. Louisell—*Wiley*, 268 p., illus., $11.50. Introduction to the theories of coupled modes, parametric amplifiers, oscillators and frequency converters.

CREATURES OF THE SEA—William B. Gray—*Funk, W.*, 209 p., illus., $3.95. Vivid descriptions of marine fauna by the Director of Collections and Exhibitions of the Miami Seaquarium.

DICTIONARY OF WORD ROOTS AND COMBINING FORMS—Donald J. Borror—*N-P Publications*, 134 p., paper, $2. Handy reference for the student of science, gives special attention to biological and scientific terms.

THE FIRST FIVE MINUTES: A Sample of Microscopic Interview Analysis—Robert E. Pittenger, Charles F. Hockett and John J. Danehy—*Paul Martineau*, 264 p., illus., $6.50. Study of two disciplines: psychiatry and anthropological linguistics.

FIRST OF THE SPACEMEN: Iven C. Kincheloe, Jr.—James J. Haggerty, Jr.—*Duell*, 148 p., photographs, $3.50. Biography of the pilot of the rocket-powered X-2 and first selected to take the X-15 to outer space.

FROM THEORY TO PRACTICE IN SOIL MECHANICS: Selections from the writings of Karl Terzaghi—L. Bjerrum and others, Eds.—*Wiley*, 425 p., illus., $12. Account of the engineer Terzaghi's life and his method of working.

GENERAL CYTOLOGY—E. D. P. De Robertis, W. W. Nowinski and Francisco A. Saez—*Saunders*, 3d ed., 555 p., illus., $10. New material has been added, putting more emphasis on the chemical, ultrastructural, genetic and physiological aspects of cytology.

HEART DISEASE, BLOOD PRESSURE AND STROKES—C. Anthony D'Alonzo—*Gulf*, 159 p., illus., $3.50. Causes, treatment, and prevention of these disorders.

HISTORY OF LIFE SCIENCE: Outlines and References—Eldon J. Gardner—*Burgess*, 180 p., illus., paper, $4.75. Designed as a guide for the biology student.

HOMES: America's Building Business—Pauline Arnold and Percival White—*Holiday*, 379 p., illus., $4.50. Informative book about the building trades and industry of today.

THE INDIAN AND HIS PUEBLO—Louise Lee Floethe—*Scribner*, illus. with drawings by R. Floethe, $2.95. Informative story for children about the life of Indians whose pueblos are near the Rio Grande.

INVESTIGATION OF THE MECHANISM OF EARTHQUAKES—E. N. Bessonova and others—*Am. Geophysical Union (Consultants Bureau)*, 201 p., illus., $7.50. Divided into the theoretical basis for seismological methodology, and data on displacements near earthquake centers of seismic areas of the U.S.S.R.

LABORATORY MANUAL FOR BOTANY—Charles LaMotte, Robert B. Stewart and Norman D. Flados—*Burgess*, 72 p., paper, $2.75. For an introductory course in Botany.

LETTERS OF SIGMUND FREUD—Ernst L. Freud, Ed., transl. by Tania and James Stern—*Basic Bks.*, 470 p., photographs, $7.50. Presents letters selected by his son, written over a period of sixty-six years to his family and world personalities.

THE MAJOR ACHIEVEMENTS OF SCIENCE—A. E. E. McKenzie—*Cambridge Univ. Press*, Vol. I, 368 p., illus., $5.50; Vol. II, 195 p., illus, $3.50. The historical account of the development of science given in volume one, is supplemented in volume two by 91 extracts from original writings.

MAN AGAINST THE ELEMENTS: ADOLPHUS W. GREELY—Irving Werstein—*Messner*, 191 p., $2.95. Juvenile biography.

THE MANNED MISSILE: The Story of the B-70—Ed Rees—*Duell*, 182 p., illus., $3.50. Facts and figures about this new advancement in aeronautics.

MAYA: Land of The Turkey and The Deer—Victor W. Von Hagen—*World Pub. Co.*, 127 p., illus. with drawings by A. Beltran, $2.95. Dramatization, for boys and girls, of the history, culture and achievements of this ancient people.

THE MEANING OF EVOLUTION: A Study of the History of Life and of Its Significance for Man—George Gaylord Simpson—*Yale Univ. Press*, 364 p., illus., paper, $1.45. Synthesis of modern views on the principles of evolution.

MINERAL METABOLISM: An Advanced Treatise, Volume I, Part A: Principles, Processes and Systems—C. L. Comar and Felix Bronner, Eds.—*Academic*, 416 pp., illus., $12.

NATIONAL SECURITY IN THE NUCLEAR AGE: Basic Facts and Theories—Gordon B. Turner and Richard D. Challener, Eds.—*Praeger*, 293 p., paper, $1.85. Essays presenting a broad coverage of the subject.

ONE DAY AT THE ZOO—Dick Snyder—*Scribner*, illus. by photographs, $2.95. A visit to the San Diego Zoo.

OPTICS IN THE ELECTROMAGNETIC SPECTRUM—C. L. Andrews—*Prentice-Hall*, 501 p., illus., $12. Textbook treating the properties of wave motion common to the whole electromagnetic spectrum.

OVUM HUMANUM: Growth, Maturation, Nourishment, Fertilization and Early Development—Landrum B. Shettles, introduction by

(Continued on p. 303)

ASTRONOMY
For Everyone
Enjoy **SKY AND TELESCOPE** magazine monthly. Profusely illustrated. Observing and telescope making departments, monthly star and planet charts. Subscription in U. S.: $5.00, 1 year; $9.00, 2 years. Sample copy, 50¢.
SKY AND TELESCOPE Dept. SNL Cambridge 38, Mass.

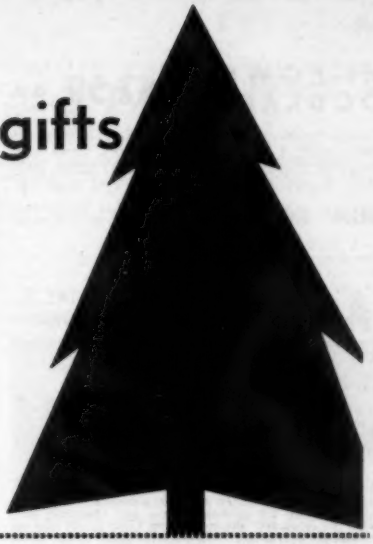
THE PURSUIT OF THE ATOM
By Werner Braunbek
Now you are invited on a "guided tour" of scientific exploration and discovery within the realm of the atom; guided, no less, by the great scientists whose brilliant work made possible the breakthrough to the atomic age. Each basic contribution to the complex pattern of research is lucidly explained, and is related to the work of others before and after.
All are here, the great ones: *Rutherford, Soddy, Becquerel, the Curies, Geiger, Bohr, Hahn, Meitner, Blackett, Cockroft, Kapitza, Walton, Einstein, Planck, Born, Von Hevesy, J. J. Thomson, Hertz, Millikan, Mach, Wilson, Heisenberg, Shroedinger, Dirac, Condon, Gamov, Lawrence, van de Graaff, Urey, the Joliot-Curies, Chadwick, Bothe, Anderson, Fermi, Strassmann, McMillan, Compton, Oppenheimer, Bethe, Teller*, etc., etc., etc.
"First rate."—*New York Times*. ORDER NOW!
$3.95 Postfree • 10-Day Money-Back Guarantee
EMERSON BOOKS, INC., Dept. 118-M
251 West 19 Street, New York 11

COMPRESSED TABLETS
(Non-medical) Made to Order
Very small sizes to the very largest. Experimental work undertaken. If you need tablets made, write us for quotations.
R. P. CARGILLE LABORATORIES, INC.
117 Liberty Street New York 6, N. Y.

Jupiter BLUE Filter: $1.50 p.p.
A useful accessory for your telescope. Especially for viewing the "Red Spot" on Jupiter. Improves seeing, greatly reduces glare. Enables you to see detail of green and darkish areas of this planet under strong solar illumination. 33mm diameter, 1mm thick. Plane parallel-polished. Famous mfg.
Unmounted. ONLY $1.50 p.p. each
HARRY ROSS *Scientific & Lab Apparatus* 61-L Reade St., N.Y. 7, N.Y.

IDENTIFY ANY TREE!
Two-volume set by foremost dendrologist. W. H. Harlow, "Trees," full text, 950 photos, covers 140 common trees of N. and N.E. USA. "Twig & Fruit Guide," enables you to identify trees & shrubs in winter, any season. Identification, folklore, uses, etc. Total 444 pp. $2.60 plus 10¢ postage. Money-back guarantee. Dept. SNL, DOVER, 180 Varick St., N. Y. 14, N. Y.

WHICH are the Christmas gifts longest remembered, most appreciated?



The durable, the practical, the gifts that subtly compliment the recipient.

You *compliment* your friends, relatives, and business associates with gift subscriptions to SCIENCE NEWS LETTER. In effect you say to them, "I know you have intellectual curiosity, that you want your mental reach lengthened, that you enjoy knowing ahead of the crowd the many and varied facets of science advancement."

Science News Letter is durable and practical—literally as well as figuratively. Subscribers often tell us they keep Science News Letter on file for reference. But it can be judged figuratively as well. The stimulating knowledge that Science News Letter imparts will last longer than all the weekly issues of 1961.

The holiday-week issue of Science News Letter will contain the SCIENCE FORECAST FOR 1961. We will start each gift subscription with this SCIENCE FORECAST issue, making a total of 53 issues to each recipient.

These are the Christmas rates:

A one-year subscription is $5.50, EACH ADDITIONAL subscription is $4.00 *(a $1.50 saving on each gift after the first)*, and you may add your own one-year renewal at this money-saving Christmas rate. No extra charge for postage to any point in the world.

Tear off the coupon at the right, fill it in and mail it back to us, please. We shall, if you like, send you a specially designed Christmas Card for each person you list so that you *yourself* can announce your gifts of SCIENCE NEWS LETTER.

Clip, fill in and mail, please

To SCIENCE NEWS LETTER
1719 N Street, N.W., Washington 6, D. C.

Please send SCIENCE NEWS LETTER every week of 1961 (plus the SCIENCE FORECAST issue) to each of the following:

Gift To *Name*.....

Address.....

City & State.....

☐ Send direct to me the specially designed Christmas Card so that I may personally sign and mail it.

Gift To *Name*.....

Address.....

City & State.....

☐ Send direct to me the specially designed Christmas Card so that I may personally sign and mail it.

Gift To *Name*.....

Address.....

City & State.....

☐ Send direct to me the specially designed Christmas Card so that I may personally sign and mail it.

THESE GIFTS ARE FROM:

My Name.....

Address.....

City & State.....

☐ *One of these subscriptions is to be a one-year renewal of my own Science News Letter subscription.*

☐ I enclose $..... ☐ Bill me after January 10.

(See Special Christmas Rates at the left) 995

HI-POWER OCULAR **$2.50** p.p.

3 Lens, corrected, positive. EFL 12.5 mm (½ inch). 20X; f 2.8; 1¼" O.D. mount. Lens unit by world famous (100% American) mfgr. Balcoted. Limited stock at this price of $2.50 p.p.

HARRY ROSS *Scientific & Lab Apparatus* 81-L Reade St., N.Y. 7, N.Y.

A MUST FOR CHEMISTRY & PHYSICS STUDENTS

The Elemental Slyd-Rul tells you, at a glance, symbol, weight, density, number, valences, color, melting and boiling point in °C for the 98 elements. An ideal educational aid for science, physics and chemistry students. $1 postpaid. Student rates: 12 or more, 75¢ ea. Money-back guarantee. The Slyd-Rul Co., 1040 West Broadway, Woodmere, N. Y.

• REMARKABLE
• PRACTICAL
• SCIENTIFIC

Ideal for party music, helping Johnny with studies, language practice, sleep learning, unlimited commercial use . . . displays, dictation, exhibits, promotions, broadcast programs...

from the electronics laboratories

ENDLESS TAPE

fits any recorder

FOR AUTOMATIC AND CONTINUOUS PLAYBACK

Cousino **AUDIO-VENDOR**

If your dealer can't supply you, write direct.

NOTHING TO CHANGE
NO REWINDING
ALWAYS READY FOR USE

COUSINO ELECTRONICS CORPORATION
2107 ASHLAND AVE.
TOLEDO 1, OHIO

Tape never leaves magazine, which serves as convenient and protective storage case. Choice of 12 to 26 minute tapes.

record or erase as with standard reel tapes

MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and hobbyists.
25¢ per word, payable in advance. Closing date 3 weeks prior to publication (Saturday).
SNL, 1719 N St., N.W., Washington 6, D. C.

BOOKS, ALL 10¢, 2000 TITLES, ALL SUBJECTS, catalog free. Cosme Bookshop, Clayton, Ga.

GOVERNMENT SURPLUS RADIOS, RECEIVERS, transmitters, gadgets, parabolic reflectors, infra-red snooperscopes, aircraft, camera, lenses. Amazing catalog 10¢. John Meshna, Malden 48, Mass.

NATIONAL GEOGRAPHIC MAGAZINES 1888-1960, any issue. Periodical Service, Box 465-SN., Wilmington, Delaware.

PHOTOMULTIPLIER TUBES, SCINTILLATOR crystals, high voltage power supplies, scalers, automatic recorders, X-Y plotter, oscillographs with galvanometers, transformers, other electronics. Never before offered. Los Alamos Sales Co., Box 795, Los Alamos, New Mexico.

THE STRUCTURE OF THE ATOM—28 PAGES with many diagrams. A completely new system of atomic structure, comprising structural center, but no nucleus. Price 25 cents ppd. C. F. Kraft, 218 Columbia Road, Annandale, Virginia.

ASTRONOMY

Mystery Object Moving Twice as Fast as Sun

➤ A MYSTERY OBJECT that may be an asteroid is now roaming the southern skies at twice the speed of the sun.

The object looks like an ordinary star without any tail as found in a comet. It is ninth magnitude, too faint to be seen with the naked eye although visible with binoculars. Its discovery by Dr. Henry L. Giclas of Lowell Observatory, Flagstaff, Ariz., was reported to Harvard College Observatory.

Alfred H. Mikesell of the U.S. Naval Observatory in Washington, D. C., said the object is moving in the same direction as known asteroids, with a speed nearly equal that of the fastest asteroids, or close to two degrees a day.

When spotted on Oct. 22, the mysterious object was in the constellation of Pisces, the fishes, visible in the southern sky.

Harvard College Observatory also reported that a comet has been spotted. Comet Malsch was located in the constellation of Cetus, the whale, the same sky area where the mystery object was found. This comet was of magnitude 8 and was reported to have a short tail.

• Science News Letter, 78:302 November 5, 1960

DENTISTRY

Grinding Teeth Seen Harmful

➤ HABITUAL GRINDING, clenching or clicking of the teeth, called bruxism, may be the cause of periodontal (gum) disease. Dr. Samuel C. Nadler of Forest Hills, N. Y., reported in the Journal of the American Dental Association, 61:470, 1960, that it is the dentist's responsibility to recognize and treat bruxism.

Although bruxism is almost a universal habit, many persons indulge in it unconsciously. It can occur either day or night.

Dr. Nadler suggests that dentists give their patients a questionnaire to aid in detecting symptoms.

In making the initial examination he says a dentist should watch for: abnormal wear of certain teeth or the entire set of teeth; recession, bleeding of the gums and inflammation of gum tissues as an indication of diseased gums; or abnormal swallowing habits.

• Science News Letter, 78:302 November 5, 1960

MEDICINE

Pediatricians Warned On Overuse of Drugs

➤ CHILDREN CAN BE easily poisoned with overdoses of aspirin or tranquilizers, the American Academy of Pediatrics meeting was told in Chicago.

Dr. A. Lawrence Chute, chief of pediatrics, Hospital for Sick Children, Toronto, Canada, warned doctors against mistakes commonly made in treatments ranging from blood transfusions to oxygen therapy.

One of the most common forms of drug disease caused by over-prescription by physicians for children, he said, is poisoning by acetylsalicylic acid, or aspirin.

Dr. Chute warned against indiscriminate use of antibiotics. He said that, next to the antibiotics, few drugs have been given to patients by physician with the same abandon as the steroids, among which is cortisone.

Steroids over a prolonged period can inhibit growth in children and cause severe osteoporosis (bone disease). When used during pregnancy in the form of testosterone or progesterone to prevent habitual abortion, steroids can produce sexual changes in the offspring of women so treated, Dr. Chute cautioned.

Blood transfusion can overload the circulation or be dangerous because of incompatibility, and in the case of the Rh factor and the possible transmission of infection, the potential danger is great.

• Science News Letter, 78:302 November 5, 1960

ARCHAEOLOGY

Ancient People Made No Progress for 2,000 Years

➤ EVIDENCE HAS BEEN unearthed of a people who lived in Arizona on one of the important trade routes of their day but who nevertheless clung to their primitive ways of living for 2,000 years, surrounded by more progressive people.

They lived on game and plants gathered from the wild, while only 70 miles away their neighbors grew corn. They ate without dishes while their neighbors made pottery.

An expedition from the Chicago Natural History Museum, sponsored by the National Science Foundation, excavated the site of this people, which was inhabited as late as 300 A.D.

Drs. Paul S. Martin, chief curator of anthropology of the Museum, and John B. Rinaldo, assistant curator of archaeology, directed the excavations. They reported that this primitive tribe lived by hunting and gathering wild plants.

Except for the addition of permanent houses, these people lived as their nomadic ancestors had done 2,000 years before. Tools seemed to be limited to grinding stones and stone-tipped spears. No evidence of agriculture and no pottery was found.

• Science News Letter, 78:302 November 5, 1960

Questions

AERONAUTICS—What is the most serious hazard to manned space travel? p. 295.

GENETICS—Why is the chicken-turkey hybrid unable to reproduce? p. 291.

GEOPHYSICS—What are some of the sources of infrasonic waves? p. 293.

Photographs: Cover, Fremont Davis; p. 291, The Decker Corporation; p. 293, National Bureau of Standards; p. 295, Kelvin Hughes; p. 298, Fremont Davis; p. 304, Eastman Chemical Products, Inc.

Books of the Week

(Continued from p. 300)

Harold Speert—*Hafner Pub. Co.*, 84 p., microphotographs, $6. Pictorial record of the development of the human ovum, with text in English, German and French.

PHYSIOLOGY IN INDUSTRY: Evaluation of Industrial Stresses by the Physiological Reactions of the Worker—Lucien Brouha—*Pergamon*, 145 p., illus., $6.50. Divided into a study of the worker, the environment, and the job.

PLAGUE FIGHTERS—Herman Styler—*Chilton Co.*, 126 p., illus., $3.50. Account of the struggle against diseases that have harassed mankind throughout history.

POLARIS!—James Baar and William E. Howard—*Harcourt*, 245 p., photographs, $4.50. Story of the creation and development of this powerful missile.

PRINCIPLES OF PLANT BREEDING—R. W. Allard—*Wiley*, 485 p., illus., $9. Intended as a text for the undergraduate student of agriculture.

ROME—M. Rostovtzeff, transl. from Russian by J. D. Duff—*Oxford Univ. Press*, 347 p., illus., paper, $2.25. New bibliography prepared by Elias J. Bickerman has been added to this classical work originally published in 1927.

THE SCIENCE BOOK LIST FOR CHILDREN—Hilary J. Deason—*Am. Assn. for the Advancement of Science*, 138 p., paper, $1. Guide to recreational and "outside" reading in the sciences and mathematics for elementary school students including the eighth grade.

A SCIENTIFIC THEORY OF CULTURE AND OTHER ESSAYS—Bronislaw Malinowski, preface by Huntington Cairns—*Oxford Univ. Press*, 228 p., paper, $1.50. Summing up and reformulating the author's functional theory of culture.

SEA WITHIN: The Story of Our Body Fluid—William D. Snively, Jr.—*Lippincott*, 150 p., illus., $3.95. For the layman, describes the vital role of body fluids.

SO YOU WANT TO BE A HAM—Robert Hertzberg—*Howard W. Sams*, 2nd ed., 188 p., illus., paper, $2.95. For the radio amateur.

THE SPACE GUIDEBOOK—William J. Weiser—*Coward-McCann*, 322 p., illus., $4.75. For the general reader, basic, up-to-date information on the sciences as applied in space research.

THE STORY OF GEOLOGY: Our Changing Earth Through the Ages—Jerome Wyckoff—*Golden Press*, 177 p., illus. with photographs and paintings by W. Sayles, H. McNaught, and R. Perlman, $4.95. Beautifully illustrated for young readers.

TABLE ROCK PUEBLO, ARIZONA—Paul S. Martin and John B. Rinaldo—*Chicago Natural Hist. Museum*, 298 p., illus., paper, $5.50. Description of anthropological discoveries near St. Johns, Arizona.

THEORY AND DESIGN IN THE FIRST MACHINE AGE—Reyner Banham—*Praeger*, 338 p., photographs, $12.50. Survey of architecture's changes in the 20th century.

THE TIBETAN BOOK OF THE DEAD—Compiled and ed. by W. Y. Evans-Wentz—*Oxford Univ. Press*, 249 p., paper, illus., $1.75. The after-death experiences on the Bardo Plane, according to Lama Kazi Dawa-Samdup's English rendering.

TRANSPORT PHENOMENA—R. Byron Bird, Warren E. Stewart and Edwin N. Lightfoot—*Wiley*, 780 p., illus., $13.75. Introduction to momentum, energy and mass transport for students of engineering and applied science.

THE VERTEBRATE FAUNA OF THE SELMA FORMATION OF ALABAMA; PART V: AN ADVANCED CHELONIID SEA TURTLE—Rainer Zangerl—PART VI: THE DINOSAURS—Wann Langston, Jr.—*Chicago Natural Hist. Museum*, 80 p., illus., paper, $3.50.

STUDENTS, TEACHERS, HOBBYISTS... Now, 42 fascinating experiments with the

New BLACK LIGHT MAGIC-GLO Kit

$11.95 complete

Study and demonstrate the phenomenon of fluorescence.
Experiments in fluorochemistry, mineralogy, scientific research, electronics, crime detection, art, medicine and stamp collecting.
Observe fluorescence of hundreds of substances from the field, in your home and at school.
You receive an ultra violet black light lamp, socket and cord set, 4 bottles invisible fluorescent paint, invisible fluorescent ink, tracer powder and crayon, fluorescent mineral specimens, phosphoragram, fluorescent dye, fluorescent elastic braid, and a box of experiment materials, pen & brushes. PLUS a 48 page illustrated manual "The Story of Black Light—the Unseen World Around Us" with 42 experiments in ultra violet fluorescence and phorescence.
Black light guaranteed harmless to eyes and skin.
Send me ..... kits. ☐ Send me further details.
Name.....
Address.....
City.....State.....Zone.....
Only $11.95 Post Free. Send check or M.O.

B L E Dept. SN-4

BLACK LIGHT EASTERN CORP. 4 Manhasset Ave. Port Washington, L.I., N.Y.

Follow-the-action
BINO-TACH attachment $3.00 p.p.

Makes it EASY for everyone to use the highest powered binoculars. Bino-tach secures any make of prism binocular to any photographic tripod or pan-head. On/off in seconds. Reduces fatigue, seeing improves 100%! It's steady! Precision turned aluminum, brush finish. Original price almost $7.00. Closing out, limited stock, $3.00 each p.p.

HARRY ROSS Scientific & Lab Apparatus 61-L Reade St., N.Y. 7, N.Y.

PRISMS $1.50

Made for U. S. govt. for tank periscopes. Fine optically ground, big precision prisms with silvered base. Terrific for all types of spectrographic work, in homemade telescopes & other optical systems for bending rays. Makes unusual paper weight (paint your name on it) or conversation piece for mantel. You'll find many other uses. NEW, PERFECT! Cost U. S. govt. $25 ea. NOW—$1.50 ea. ppd. or 4 for $5.00. Name as above—1" long (no silver backing) $1. ea. 5 for $4. Postage paid on prepaid orders. Calif. res. add sales tax.
Volume Sales Co., War Assets Div., Dept. L115
3828 Sunset Blvd. Los Angeles 26, Calif.

GOLD • SILVER • URANIUM

LEARN How to Know and Identify Ores and Minerals. This Prospector's set of 24 Ores and Minerals, including Gold, Silver, Uranium, Copper, Lead, Zinc, Nickel and 17 others—PLUS a 102 page, fully illustrated book, with easy to follow—step by step instructions; shows you how to identify hundreds of minerals.—Complete with magnifying glass—$4.95
MERRITT MINERALS
2112-L Fort Dearborn Sta., Dearborn, Michigan

For the Amateur Scientist

An unusual microscope and dissecting kit, powered by two standard pen-light batteries.
- 4 turret nosepiece has 4 objectives
- 2oculars are supplied, giving magnifications of 100X, 150X, 200X, 300X, 450X, 600X
- Opposite side of lamp has a plane mirror so that the instrument may also be used by reflected light.
- Dissecting set contains: 1 pair surgical type dissecting scissors, 1 spatula, 1 dissecting forceps (tweezers), 1 long handled dissecting needle, 1 scalpel, 1 hand magnifier, rack containing 6 specimen slides.
- All fitted in hardwood carrying case.

Price $10 Ppd.

WINN SCIENCE CENTER, Dept. C300,
124 West 23 Street, New York 11.
Please rush me my microscope & dissecting kit plus a *FREE* catalog of microscope accessories.
Name
Address
City State

Get UNITRON's FREE
Observer's Guide and Catalog on
ASTRONOMICAL TELESCOPES

This valuable 38-page book is yours for the asking!

With artificial satellites already launched and space travel almost a reality, astronomy has become today's fastest growing hobby. Exploring the skies with a telescope is a relaxing diversion for father and son alike. UNITRON's handbook contains full-page illustrated articles on astronomy, observing, telescopes and accessories. It is of interest to both beginners and advanced amateurs.

Contents include—
- Observing the sun, moon, planets and wonders of the sky
- Constellation map
- Hints for observers
- Glossary of telescope terms
- How to choose a telescope
- Amateur clubs and research programs

UNITRON
INSTRUMENT COMPANY • TELESCOPE SALES DIV.
66 NEEDHAM ST NEWTON HIGHLANDS 61 MASS

Please rush to me, free of charge, UNITRON'S new Observer's Guide & Telescope Catalog. S-I-1
Name.....
Street.....
City.....State.....

New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1064. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

MEDICAL LOCKET, made of stainless steel, will hold medical instructions that could save the wearer's life in an emergency. Especially desirable for diabetics, patients sensitive to certain drugs and those with rare blood groups, the locket comes with a 24-inch chain or a fob pin.

• Science News Letter, 78:304 November 5, 1960

GOLF PRACTICE NET, seven feet square on a steel pipe frame, can be set up indoors or out to catch balls used in practice. The net indicates whether the golfer has sliced or hooked by showing the fault on the rebound.

• Science News Letter, 78:304 November 5, 1960

ROOM DIVIDER PANELS lock together for easy construction of decorative dividers. The 12-by-12-inch panels are made of plastic, in two designs, and are available in white and gold or black and gold. The unique locking method makes it possible to install these units without tools.

• Science News Letter, 78:304 November 5, 1960

EASY-TO-HOLD HAIRBRUSH for professional or home use features a plastic, contour handle with a thumb-rest that prevents the brush, shown in the photograph, from twisting in the hand and helps eliminate wrist fatigue. Bristles are placed in 84 specially arranged tufts to act like a comb and at the same time fluff and polish the hair.

• Science News Letter, 78:304 November 5, 1960

FAUCET SHARPENER hones knives by water power. The sharpener fits on laundry tub or aerated type kitchen faucets where water rushing through the sharpener can turn its aluminum oxide grinding wheel.

• Science News Letter, 78:304 November 5, 1960

LOCK "ANTI-FREEZE" prevents locks from freezing, and removes ice from frozen automobile, garage and other outside locks. The chemical product is sold in plastic squeeze bottles.

• Science News Letter, 78:304 November 5, 1960

STAND-UP SCALE has a handle that also serves as an easel leg so the bathroom scale can be stood on end against a wall, thus saving space. The scale has a magnified dial for easy reading and comes in silver, sandalwood, white, black, pink and turquoise.

• Science News Letter, 78:304 November 5, 1960

PIPE SEALER TAPE, for dry sealing all types of threaded pipe joints and threaded cable connectors, is unaffected by temperatures in excess of minus 250 degrees Fahrenheit to 500 degrees Fahrenheit. The tape comes in one-half-inch strips in ten standard colors. The material can be used on various materials including steel, iron, brass, plastic, aluminum and synthetic rubber.

• Science News Letter, 78:304 November 5, 1960

Nature Ramblings

THE FALL MIGRATION is nearly over now. Fat-laden birds from all over the United States have flown southward, answering an inner urge to leave their birthplaces and breeding grounds for a trip into the unknown.

These birds do not "know" that a cold winter awaits them if they stay in the north. Indeed, young birds of the year could not know of winter, while the adults of most migratory species have never passed a winter in the north to witness the icy spectacle.

What force, then, impels them to flee a danger about which they know nothing? There is a simple answer: instinct. But this is only begging the question.

The origin of an inherited instinct to fly south in winter, and north in summer, is lost in the dim, early history of each migratory species.

We can only guess at the facts, and we know but little more about the specific factor that sets off the migratory flight.

It is commonly believed that the arrival of cool weather starts the migration, and this is true enough for some species. But

Southward Ho!

many North American migrants depart for the south long before the first break in the weather.

Another trigger that has been proposed is length of day. Certain birds, for example the Oregon junco, have been forced into migratory condition in midwinter by altering the amount of light received each day. Thus, the shortening of the day with autumn's approach might set off the pattern of migration.

But because birds also migrate from the tropics where the amount of daylight scarcely varies through the year, some scientists support the theory that a "biological clock" within a bird signals the time for migration to begin, more or less independently of external factors.

The truth probably lies in all these possibilities. Apparently the migratory instinct is one which has been acquired independently by many different kinds of birds at different times. Thus it would hardly be expected that the same trigger for migration would apply for all birds.

Whatever the cause for migration and the immediate factor that sets it off, almost all migratory birds begin preparing for their big adventure early. The trip will take fuel, in the form of heavy fat deposits, and most birds do not undertake a migratory flight until such a store is built up.

The amount of energy required to take a hummingbird on its non-stop flight across the Gulf of Mexico has been calculated as something under the amount available in the tiny bird's store of migratory fat.

—HORACE LOFTIN

• Science News Letter, 78:304 November 5, 1960